

WE CLAIM AS OUR INVENTION:

1. An illumination unit comprising:
a monolithic semiconductor laser diode array containing a plurality of individually driveable laser diodes, each of which emits radiation;
an optical arrangement for at least one of collimating and focusing said radiation for producing a radiation beam having a substantially circular cross-section;
a common carrier on which said laser diode array and said optical arrangement are mounted;
a plurality of pin-like terminal elements at said carrier electrically connected to said laser diode array for transmitting drive signals to said laser diodes;
and
a covering that is transparent to said radiation and which encapsulates said carrier.

2. An illumination unit as claimed in claim 1 wherein said optical arrangement includes at least one deflection mirror for deflecting radiation from said laser diodes through said cover.

3. An illumination unit as claimed in claim 2 wherein said radiation is emitted from said laser diodes in an emission direction, and wherein said deflection mirror deflects said radiation by 90° relative to said emission direction.

Sub 8.7
4. An illumination unit as claimed in claim 2 wherein said deflection mirror comprises a ceramic component having a vapor-deposited mirrored surface.

5. An illumination unit as claimed in claim 1 comprising a plurality of bond wires electrically connecting said laser diode array to said pin-like terminal elements.

Sub 4.13
6. An illumination unit as claimed in claim 5 wherein each of said laser diodes is directly connected to one pin-like element via a respective bond wire for forming a p-contact, and wherein said carrier as an electrically conductive layer at a side of said carrier at which said laser diode array is mounted, said electrically conductive layer being connected to at least one of said pin-like terminal elements via a bond wire and forming an n-contact for said laser diode array.

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7. An illumination unit as claimed in claim 1 wherein said carrier has a laterally closed recess in which said laser diode array and said optical arrangement are disposed; and wherein said covering comprises a flat element closing said recess.

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8. An illumination unit as claimed in claim 1 wherein said optical arrangement comprises pre-fabricated component.

9. An illumination unit as claimed in claim 1 wherein said radiation is emitted by said laser diodes in an emission direction, and wherein said optical arrangement collimates said radiation in two axes disposed perpendicularly to each other and disposed perpendicularly to said emission direction.

10. An illumination unit as claimed in claim 1 wherein said carrier comprises a ceramic carrier formed by multi-layer technology.

11. An illumination unit as claimed in claim 1 wherein said laser diode array and said optical arrangement are secured to said carrier with a glued connection.

12. An illumination unit as claimed in claim 11 wherein said cover is also secured to said carrier with a glued connection.

13. An illumination unit as claimed in claim 11 wherein said glued connection is comprised of a temperature-resistant adhesive.

14. An illumination unit as claimed in claim 1 wherein said optical arrangement is secured to said carrier with a glued connection and wherein said laser diode array is secured to said carrier with a soldered connection.

15. An illumination unit as claimed in claim 1 wherein said covering is comprised of glass.

16. An illumination unit as claimed in claim 15 wherein said covering is comprised of ant-reflection coated glass.

17. An illumination unit as claimed in claim 1 further comprising a cooling element in thermal communication with said carrier.

18. An illumination unit as claimed in claim 17 wherein said cooling element is disposed at said carrier at a region of said laser diode array.

19. An illumination unit as claimed in claim 17 wherein said cooling element comprises a Peltier element.

20. An illumination unit as claimed in claim 1 wherein said carrier comprises a surface mounted device and wherein said illumination unit further comprises a carrier plate securable to said carrier by soldering.

21. An illumination unit as claimed in claim 20 wherein said carrier is securable to said carrier plate with a re-flow process.

22. An illumination unit as claimed in claim 20 further comprising a chip housing containing said carrier, said chip housing being secured to said carrier plate.